

N60200.AR.009092
NAS CECIL FIELD
5090.3a

SAMPLING AND ANALYSIS REPORT BUILDING 364 BASE REALIGNMENT AND CLOSURE
ZONE D INDUSTRIAL AND FLIGHTLINE AREA GROUP III NAS CECIL FIELD FL
11/1/1997
ABB ENVIRONMENTAL

SAMPLING AND ANALYSIS REPORT

BUILDING 364

BASE REALIGNMENT AND CLOSURE

**ZONE D, INDUSTRIAL AND FLIGHTLINE AREA
GROUP III**

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

Unit Identification Code: N60200

Contract No.: N62467-89-D-0317/090

Prepared by:

**ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Tallahassee, Florida 32301**

Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29419**

David Porter, Code 18B9, BRAC Environmental Coordinator

November 1997

TABLE OF CONTENTS

Sampling and Analysis Report, Building 364
Base Realignment and Closure
Zone D, Industrial and Flightline Area Group III
NAS Cecil Field, Jacksonville, Florida

<u>Chapter</u>	<u>Title</u>	<u>Page No.</u>
1.0	INTRODUCTION	1
2.0	PHASE II INVESTIGATION	1
3.0	PRELIMINARY RISK EVALUATION (PRE)	1
3.1	PUBLIC HEALTH PRE	3
3.2	ECOLOGICAL PRE	3
4.0	CONCLUSIONS AND RECOMMENDATIONS	4
	REFERENCES	5
	APPENDIX	

Appendix A Soil Boring Logs and Tables

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page No.</u>
1	Building 364, Criminal Investigations/Security Facility Sample Location Plan	2

GLOSSARY

ABB-ES	ABB Environmental Services, Inc
BCT	Base Realignment and Closure cleanup team
EBS	environmental baseline survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
GGC	groundwater guidance concentrations
HQ	hazard quotient
$\mu\text{g}/\ell$	micrograms per liter
NAS	Naval Air Station
PRE	preliminary risk evaluation
RBC	Risk-Based Concentrations
SAO	sampling and analysis outline
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), under contract to the Southern Division, Naval Facilities Engineering Command, has completed the Phase II Sampling and Analysis program for Building 364 at Naval Air Station (NAS) Cecil Field. This report summarizes the related field operations, results, conclusions, and recommendations of the Phase II investigation.

Building 364 is a former Naval Correctional Custody unit and is now used as administrative office space. Potential environmental concerns identified for the facility include the presence of a septic system and lift station, located to the north of the building. The Base Realignment and Closure cleanup team (BCT) regards septic tank and leachfield systems as potential pathways for contaminants to enter the groundwater. No other environmental concerns were identified for this facility in the environmental baseline survey (ABB-ES, 1994b).

A Sampling and Analysis Outline (SAO) for the assessment of groundwater downgradient of the septic system at Building 364 was prepared by ABB-ES and approved by the BCT (ABB-ES, 1995a). The results of the Phase II Sampling and Analysis program developed in the SAO are discussed below.

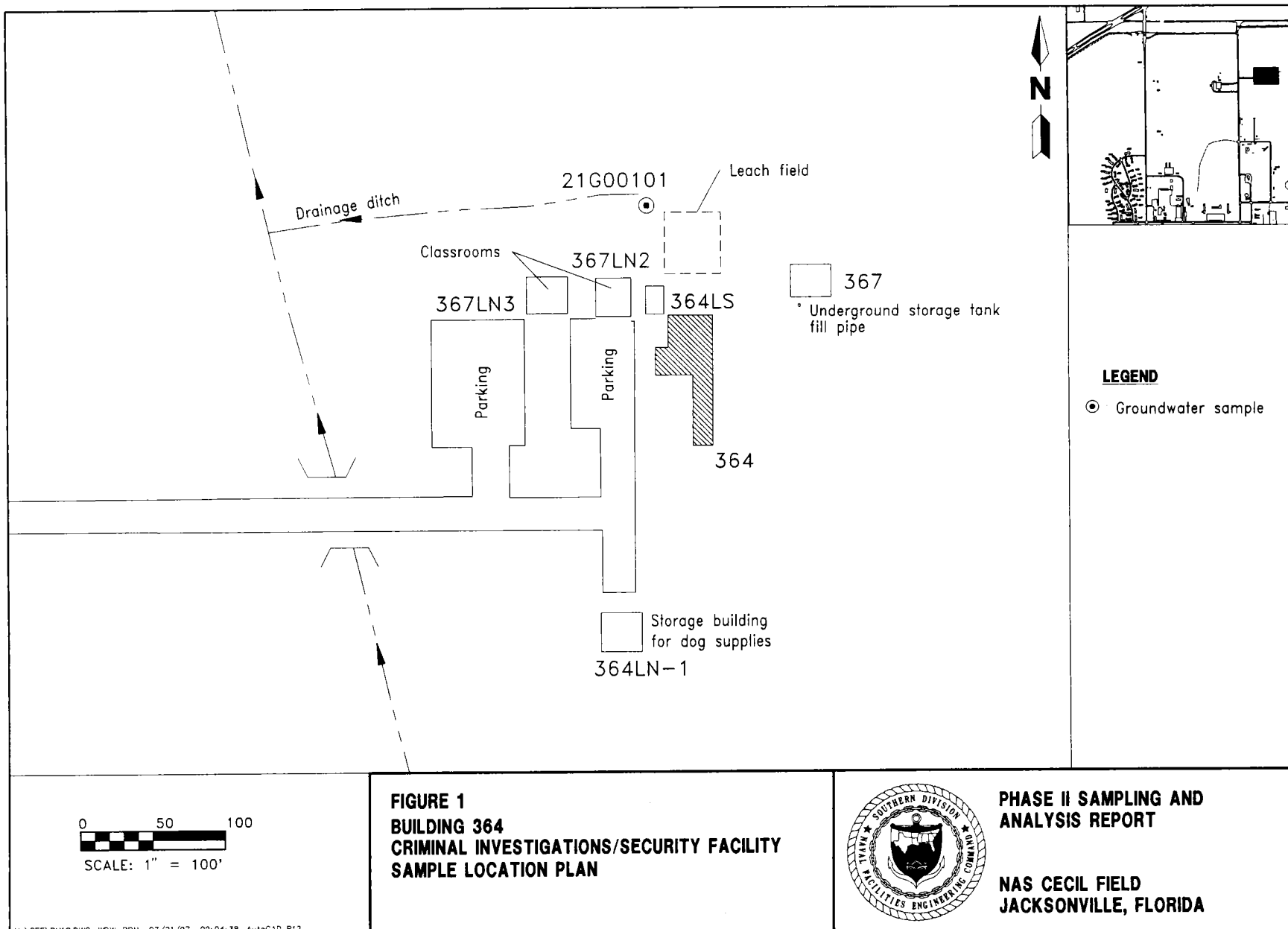
2.0 PHASE II INVESTIGATION

The Phase II investigation included the installation of one shallow groundwater monitoring well and collection and analysis of one groundwater sample. Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994a).

A groundwater monitoring well was installed, to a depth of 13 feet below land surface, between the septic leachfield and the drainage swale. One groundwater sample was collected and analyzed for the full Contract Laboratory program suite of target compound list organics and target analyte list inorganics. A general site plan indicating the location of the monitoring well is presented on Figure 1. The soil boring log is included in Appendix A.

3.0 PRELIMINARY RISK EVALUATION (PRE)

A PRE was conducted to assess potential risks to human and ecological receptors posed by contaminants in groundwater. Primary exposure pathways were evaluated to determine which potentially contribute to human health and ecological risks. The evaluation was conducted in general conformance with methodology provided in the U.S. Environmental Protection Agency (USEPA) Region IV Memorandum "Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994), USEPA Region IV Bulletin on Ecological Risk Assessment (USEPA, 1995), and minutes of meetings with the USEPA and the Florida Department of Environmental Protection (FDEP) concerning PREs (ABB-ES, 1995b). Site background information and rationale for sample collection and analysis are detailed in the EBS Report (ABB-ES, 1994b) and the SAO (ABB-ES, 1995a).



3.1 PUBLIC HEALTH PRE. All detected analytes were compared to readily available risk-based screening values to assess the likelihood of adverse human health effects associated with potential exposure to groundwater. Risk-based screening values were obtained from USEPA Region III Risk-Based Concentrations (RBCs) (USEPA, 1996) and FDEP Groundwater Guidance Concentrations (GGC) (FDEP, 1994). Most screening values published in the references listed above are based on toxicity constants and standard human exposure scenarios, and correspond to fixed levels of risk. The designated level of risk for noncarcinogenic chemicals is based on a hazard quotient (HQ) of 1. The level of risk for carcinogenic chemicals is based on an excess lifetime cancer risk (ELCR) of 1×10^{-6} . Cancer and noncancer risks associated with industrial and residential land use are estimated by dividing the maximum detected analyte concentration by the corresponding USEPA Region III RBC value at the designated level of risk (HQ of 1 or ELCR of 1×10^{-6}).

Thirteen inorganic analytes were detected in the groundwater sample collected in the study area. A comparison among concentrations of detected analytes in groundwater, RBCs for tap water, and FDEP GGC is included in Appendix A.

Iron and manganese were detected at concentrations exceeding FDEP GGC. The FDEP GGCs for iron and manganese are secondary standards. The concentration of arsenic detected is in excess of the RBC for tap water, but below the FDEP GGC.

The cumulative noncancer risk or hazard index calculated for the detected analytes is 0.9, based upon RBCs for tap water, and is primarily attributable to iron. The ELCR calculated for groundwater is 7.3×10^{-5} . Arsenic was detected at a concentration 3.3 micrograms per liter ($\mu\text{g}/\ell$) and is the only carcinogenic analyte detected in the groundwater sample. Although this concentration is in excess of the 0.045 $\mu\text{g}/\ell$ RBC for tap water, it is below Federal and State drinking water standards of 50 $\mu\text{g}/\ell$.

3.2 ECOLOGICAL PRE. The ecological habitat associated with Building 364 was characterized by ABB-ES ecologists in June 1996. Building 364 is surrounded by mowed grass and pavement. A grass-lined drainage swale is located approximately 20 feet to the north and may represent a potential exposure pathway to groundwater for limited aquatic organisms (i.e., invertebrates and amphibians). The drainage swale is only likely to hold standing water following heavy precipitation.

All analytes detected in the groundwater sample were conservatively compared to available ecological screening values to assess the likelihood of adverse effects on aquatic plants and animals associated with potential exposure to groundwater. The detected concentrations of aluminum, copper, iron, and zinc in groundwater exceeded ecological screening criteria for surface water selected for this evaluation. Aluminum, copper, iron, and zinc were detected at 161 $\mu\text{g}/\ell$; 3.1 $\mu\text{g}/\ell$; 7,920 $\mu\text{g}/\ell$; and 32.2 $\mu\text{g}/\ell$, respectively. The lowest ecological surface water screening criteria for aluminum, copper, iron, and zinc are 50 $\mu\text{g}/\ell$; 1.5 $\mu\text{g}/\ell$; 1,000 $\mu\text{g}/\ell$; and 17.1 $\mu\text{g}/\ell$, respectively (refer to the Preliminary Ecological Risk Evaluation Table, Appendix A).

Considering the low level of exceedances for all analytes, and the likelihood that chemicals detected in groundwater will be diluted upon discharge to surface water, it is unlikely that aquatic life is at risk from exposure to aluminum,

copper, iron, and zinc in groundwater. In addition, the detected concentrations of aluminum, copper, iron, and zinc are less than the average background groundwater concentrations reported for NAS Cecil Field (ABB_ES, OU 2 RI, 1995b). Therefore, the analytes detected in the groundwater sample collected at Building 364 are unlikely to represent a significant risk to ecological receptors in the nearby drainage swale.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A cumulative hazard index of 0.9 and an ELCR of 7.3×10^{-5} were calculated for all detected analytes in groundwater. Secondary FDEP GGCs for iron and manganese were exceeded. Arsenic was detected at a concentration in excess of its respective RBC, but far below the FDEP GGC. In addition, potable water is supplied to Building 364 from a remote source; therefore, a groundwater-to-receptor pathway does not currently exist.

The detected concentrations of analytes in groundwater were compared to surface water screening values to evaluate the potential effects on aquatic life. Although aluminum, copper, iron and zinc were detected at concentrations in excess of screening values, the detected concentrations were below background groundwater concentrations. Furthermore, the magnitude of copper and iron exceedances are slight, and groundwater concentrations of these chemicals would be diluted upon discharge to surface water. Therefore, it is unlikely that a groundwater to surface water exposure pathway in this area would represent a significant risk to ecological receptors.



Based upon the information obtained for this assessment, the concentrations of analytes detected in groundwater at Building 364 do not represent a hazard to human health or the environment. Therefore, the color-classification for Building 364 should be changed from Gray to Light Green.

REFERENCES

- ABB Environmental Services, Inc. (ABB-ES). 1994a. *Project Operations Plan for Cecil Field and Health and Safety Plan*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (December).
- ABB-ES. 1994b. *Base Realignment and Closure Environmental Baseline Survey Report, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (November).
- ABB-ES. 1995a. *Sampling and Analysis Outline, Building 364, Base Realignment and Closure, Zone D, Industrial and Flightline Area, Group III, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (February).
- ABB-ES. 1995b. Minutes of September 25, 1995, conference call to discuss preliminary risk evaluations.
- ABB-ES. 1995c. *Remedial Investigation, Operable Unit 2, Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (May).
- Florida Department of Environmental Protection. 1994. *Groundwater Guidance Concentrations*. Bureau of Drinking Water and Groundwater Resources, Tallahassee, Florida (June).
- U.S. Environmental Protection Agency (USEPA). 1994. *USEPA Region IV, Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)*. Atlanta, Georgia, (December 20).
- USEPA. 1995. *Region IV Waste Management Division Preliminary Risk Evaluation, Ecological Risk Assessment, Supplemental Guidance to RAGS*. Region IV Bulletin No. 1 (November).
- USEPA. 1996. *Region III Risk-Based Screening Table, Region III, Technical Guidance Manual*. Risk Assessment. EPA/903/R-93-001 (May).

APPENDIX A
SOIL BORING LOGS AND TABLES

Project: NAS Cecil Field BRAC		Well ID: CEF-384-IS	Boring ID: CEF-384-IS
Client: SOUTHDIYNAVFACENGCOM	Contractor: Alliance Environmental, Inc.		Job No.: 08520-85
Northing/Easting:		Date started: 11-30-95	Compltd: 11-30-95
Method: Auger	Casing dia.: 2 in.	Screened int.: 2 - 12 ft.	Protection level: □
TOC elev.: Ft.	Type of OVM: PID	Total dpth: 13.0Ft.	Dpth to ▽: 3.5 Ft.
ABB Rep.: R. Holloway	Well development date: 12-18-95		Site: 21 - 384 Criminal Invest.

Depth Ft.	Laboratory Sample ID.	Sample Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.	Well diag.
			1.7	SILTY SAND (SM): 100%, very dark grayish brown to light gray, quartz, fine- to very fine-grained, subangular, well sorted.		SM	posthole	
			3.1				posthole	
5								
10								
15								
20								
25								
30								

**BRAC Preliminary Risk Evaluation Table for Analytes Detected in Groundwater
Building 364, Naval Air Station Cecil Field**

Analyte	Sample	Screening Values		Calculated Risk Values	
	21G00101	FDEPGGC	RBC(T)	ELCR	HI
Inorganic Analytes					
Aluminum	161	200 s	37000 n	7.3E-05	0.0
Arsenic	3.3	50 p	0.045 c		
Barium	38.8	2000 p	2800 n		0.0
Calcium	128000				
Copper	3.1	1000 s	1500 n		0.0
Iron	7920	300 s *	11000 n		0.7
Magnesium	8960				
Manganese	112	50 s *	840 n		0.1
Potassium	3850				
Sodium	14400	160000 p			
Vanadium	5.7	49 st	260 n		0.0
Zinc	32.2	5000 s	11000 n		0.0
Cyanide	4.5	200 p	730 n		0.0
			Sum =	7.3E-05	0.9

Notes:

All Analytes are reported in ug/l

Sample Suffixes indicate the following:

F=filtered sample, DL= laboratory diluted sample, RE= laboratory re-extracted, D=field duplicate

FDEPGGC = FDEP Groundwater Guidance Concentration, June 1994

* = values that exceed FDEPGGC

p= primary standard (MCL)

st= systemic toxicant

t= organoleptic standard

s= secondary standard (related to taste, odor, color, or other non-aesthetic effects)

RBC(T)= Risk-based Concentration (Tap Water), USEPA Region III, May 1996

c= carcinogenic risk

n= non-carcinogenic risk

ELCR = calculated excess lifetime cancer risk, (ELCR = detected concentration/RBC(T) * 10E-06)

HI = calculated Hazard Index for non-carcinogenic analytes (HI=detected concentration/RBC(T))

The RBC for free cyanide was used for calculation of the HI

**BRAC Preliminary Ecological Risk Evaluation Table for Analytes Detected in Groundwater
Building 364, NAS Cecil Field**

Analyte	Sample Identifier	Screening Criteria			
	21G00101	Region IV ¹	Ambient ²	Florida ³	AQUIRE ⁴
<u>Inorganic Analytes</u>					
Aluminum	161	87 *	87 *		50 *
Arsenic	3.3	190	190	50	
Barium	38.8				8900
Calcium	128000				
Copper	3.1	7	7	7	1.5 *
Iron	7920	1000 *	1000 *	1000 *	3700 *
Magnesium	6960				
Manganese	112				280
Potassium	3850				
Sodium	14400				
Vanadium	5.7				128
Zinc	32.2	59	59	59	17.1 *
Cyanide	4.5	5.2	5.2	5.2	

Notes:

Analytes detected in groundwater are compared to surface water screening criteria due to a potential for a surface water exposure pathway

All Analytes are reported in ug/l.

* Asterisk indicates screening criteria has been exceeded.

Screening Criteria (refer to Project Operations Plan, ABB-ES, 1995, Appendix A for details and acronyms)

¹ USEPA Region IV Waste Management Division Chronic Freshwater Surface Water Screening Values

for Hazardous Waste Sites (November, 1995)

² Federal Ambient Water Criteria (USEPA 1988, 1991)

³ Florida Administrative Code Surface water Quality Standards, Chapter 62-302 (1995)

⁴ Reported toxicity values from the USEPA Aquire database